Omnitron Systems Technology, Inc.

iConverter® T3/E3 User Manual

OVERVIEW:

The *iConverter* T3/E3 managed media converter is a member of the modular *iConverter* product family. The T3/E3 provides standard T3 (B3ZS line protocol, 44.763Mbps) or E3 (HDB3 line protocol, 34.368Mbps) coax to fiber conversion and can be used by telco service providers and enterprise users to connect devices such as PBXs, multiplexers, routers and video servers via multimode (MM), single-mode (SM) or single-mode single-fiber (SF) fiber.

Designed to extend the standard T3/E3 Coax network distances over fiber, this converter provides protection from environmental noise and effectively increases high-speed network reliability.

The T3/E3 module can be used in any of the *iConverter* chassis such as the 1-Module, 2-Module, 5-Module and 19-Module chassis.

The T3/E3 can be used in a managed or unmanaged fashion. When unmanaged, it can be installed in an *iConverter* chassis without a Network Management Module (NMM). To be managed, a NMM module must be installed in the same chassis as the T3/E3 module. To read about specific management functionality, refer to the *NetOutlook™* user manual T3/E3 section.

This User Manual covers the models listed in the following table.

T3/E3 MODEL NUMBER REFERENCE CHART:

iConverter T3/E3 Coax Dual Fiber Modules

Fiber Type	Distance	Connector Type				
		ST	SC	MT-RJ	LC	SFP
-	-	-	-	-	-	8759-0*
MM	5 km	8740-0	8742-0	8744-0	-	-
SM	30 km	8741-1	8743-1	8745-1	8747-1	-
SM	60 km	8741-2	8743-2	-	8747-2	-
SM	120 km	-	8743-3	-	8747-3	-

iConverter T3/E3 Coax Single-Fiber Modules

Fiber / Connector Type	Distance	Tx: 1310 nm, Rx: 1550 nm	Tx: 1550 nm, Rx: 1310 nm
SM / SC	20 km	8750-1	8751-1
SM / SC	40 km	8750-2	8751-2

For wide temperature (-40 to 60º C), add a "W" to the end of the model number.
Consult factory for extended temperature (-40 to 75º C) models.
When using single-fiber (SF) media converter models, the TX wavelength on one end has to match the RX wavelength on the other.
*See SFP data sheet under Fast Ethernet for supported transceiver models.

FRONT PANEL DIP-SWITCH SETTINGS:

The following DIP-switches are located on the front of the T3/E3 converter. These switches provide data path control (normal operation and loop-backs) and test patterns (all 1's) that assist in installation and fault isolation.
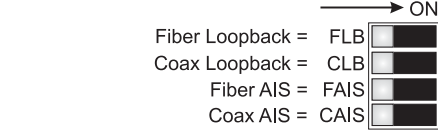

Fiber Loopback = FLB
Coax Loopback = CLB
Fiber AIS = FAIS
Coax AIS = CAIS

Fig. 1 Front Panel DIP-Switches

Normal Mode Operation (Straight Through):
The default DIP-switch setting (all dip-switches to the left) sets the converter to its Normal Mode and allows data to flow straight through between the BNC and Fiber ports (Figure 2).
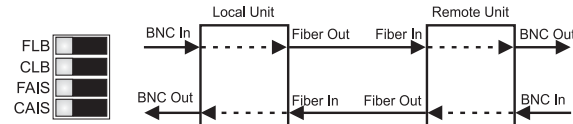

Fig. 2 Normal Mode and DIP-Switch Settings

"FLB" Dip-Switch - Local Fiber Mode Operation (Fiber Loopback):
This DIP-switch facilitates the testing of the fiber cables. When the "FLB" dip-switch is in the right position, it sets the fiber port to a Local Fiber Loopback Mode (Figure 3) and the "FLB" LED is turned ON. When in this mode, data received at the Fiber-In is forwarded to the BNC-out and the Fiber-Out. If no data is received at Fiber-In, an AIS pattern is transmitted out both BNC-Out and Fiber-Out. By returning the DIP-switch to the left position, the unit resumes normal operation.

Fig. 3 Fiber Loopback and DIP-Switch Settings

"CLB" DIP-Switch - Local Coax Mode Operation (Coax Loopback):

This DIP-switch facilitates the testing of the coax cables. When the "CLB" dip-switch is in the right position, it sets the coax port to a Local Coax Loopback Mode (Figure 4) and the "CLB" LED is turned ON. When in this mode, data received at the BNC-In is forwarded to the BNC-Out and the Fiber-Out. If no data is received at BNC-In, an AIS pattern is transmitted out both BNC-Out and Fiber-Out. By returning the DIP-switch to the left position, the unit resumes normal operation.
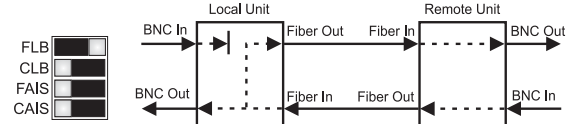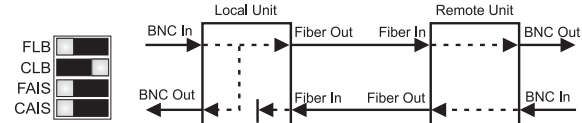

Fig. 4 Coax Loopback and DIP-Switch Settings

Remote Loopback Mode:
When both the "FLB" and "CLB" DIP-switches are in the right position, they force a remote unit to loop back its fiber and coax ports (Figure 5). This facilitates test of the fiber cables and the remote unit without having to physically set DIP-switches on the remote unit. While in this mode, the local unit's BNC is set to a local loopback, and its "FLB" and "CLB" LEDs are turned ON.

While in the Remote Loopback Mode, the local unit sends a test pattern to the remote unit. This pattern forces the remote unit into the loopback mode and is also returned back to the local unit. When forced into the Remote Loopback Mode, the remote unit's "FLB" and "CLB" blink slowly (1Hz).

When the test pattern is received successfully at the local unit's Fiber-In, the "TST" LED blinks rapidly (10Hz). Any other data causes slow "TST" blinking (1Hz). If no data is returned to Fiber-In, the LED is turned OFF.

Returning both dip-switches to the left position, causes the local and remote units to resume normal operation.
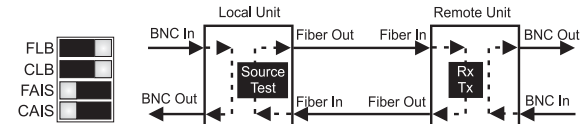

Fig. 5 Remote Loopback and DIP-Switch Settings

"FAIS" Force AIS to Fiber (Force 1's to Fiber):

When the "FAIS" dip-switch is in the right position, an "all ones" pattern is forced out the Fiber-Out port. The Coax-In data is discarded and Fiber-In data is passed through to BNC-Out. By returning the dip-switch to the left position, the unit resumes normal operation.

"CAIS" Force AIS to Coax (Force 1's to Coax):

When the "CAIS" dip-switch is in the right position, an "all ones" pattern is forced out the BNC-Out port. The Fiber-In data is discarded and BNC-In data is passed through to Fiber-Out. By returning the dip-switch to the left position, the unit resumes normal operation.

ON BOARD DIP-SWITCH SETTINGS:

[Switch Position] Function	Left Position	Left Function	Right Position	Right Function
[1] T3 Select	OFF (default)	-	T3	T3 Selected
[2] E3 Select	OFF (default)	E3 is selected when T3 and STS-1 are OFF	E3	E3 Selected
[3] STS-1 Select	OFF (default)	-	STS-1	STS-1 Selected
[4] Coax build-out distance selection	<225 (default)	Short distance, less than 225ft.	>225	Long distance, equal-to or more than 225ft
[5] Coax port control	CEN (default)	Coax port enabled	CDIS	Coax port disabled [OFF]
[6] Fiber port control	FEN (default)	Fiber port enabled	FDIS	Fiber port disabled [OFF]
[7] Force PRBS to BNC-Out	OFF (default)	Normal data	PRBS	Force PRBS[1] to BNC-Out
8 = Reserved	-	-	-	-

Note: [1] Pseudo Random Bit Sequence [PRBS] is a data pattern defined by ITU O.151 spec: E3: 2^23-1, T3: 2^15-1

The On Board DIP-switches facilitate the selection between T3, E3, STS-1 protocols, the coax distance, fiber and coax port control and the injection of pseudo random data patterns into the coax.
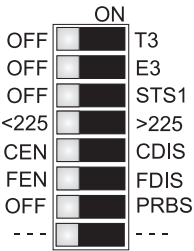

Fig. 6 Board Mounted DIP-Switches

"T3" "E3" and "STS-1" DIP-Switches - Select Protocol:
When the "T3" DIP-switch is in the right position, the T3 protocol is selected. When the "E3" DIP-switch is in the right position, the E3 protocol is selected. When the "STS-1" DIP-switch is in the right position, the STS-1 protocol is selected. Only one of the three DIP-switches may be in the right position at any one time. The default setting of the module has no mode selected (the module will default to E3 mode with no switches set).

"<225/>225" Coax Build-Out Distance selection:
When this DIP-switch is in the left position, a distance of less than 225 ft. is selected. When in the right position, a distance of 225 ft. or higher is selected. Select the appropriate distance for your application.

"CEN/CDIS" and "FEN/FDIS" Port Control DIP-Switches:
When both DIP-switches are in the left position, the ports are enabled. When the "CEN/CDIS" is in the right position, the coax port is disabled. When the "FEN/FDIS" is in the right position, the fiber port is disabled.

"PRBS" Pseudo Random Pattern Generator Control DIP-Switch:
When in the right position, the converter forces Pseudo Random pattern out of the Coax-Out port. The data received at Fiber-In is discarded and the data at Coax-In is passed through to Fiber-Out.

Note: Some combinations of DIP-switch settings are illegal, and will be indicated by the Fiber Test "TST" LED blinking quickly three times followed by a pause.

T3/E3 LED REFERENCE CHART:

Function "Legend"	Color	OFF State	ON / Blinking state
Power "Pwr"	Amber	No Power	On: Power available
Fiber Activity "Act"	Green	No valid data	Fast blink (10Hz): Data Received
Fiber AIS "AIS"	Amber	--	Fast blink (10Hz): AIS Received.
Fiber Test detected "TST"	Amber	No Test Data Received	Local unit asserting Remote Loopback: Fast blink (10Hz): Test pattern received. Slow blink (1 Hz): Unexpected pattern received. Special Case: Three quick blinks (2Hz) and pause (1sec.): Illegal dip-switch selection.
Fiber Loopback "FLB"	Amber	Normal	ON: Local Fiber Loopback. If "CLB" also "ON" indicates that the unit is the Local Unit in Remote Loopback Mode. Slow blink (1Hz) and also "CLB" in slow blink: indicates that the unit is the Remote Unit in Remote Loopback Mode.
Coax Loopback "CLB"	Amber	Normal	ON: Local Coax Loopback. If "FLB" also "ON" indicates that the unit is the Local Unit in Remote Loopback Mode. Slow blink (1Hz) and also "FLB" in slow blink: indicates that the unit is the Remote Unit in Remote Loopback Mode.
Coax Activity "ACT"	Green	No valid data	Fast blink (10Hz): Data Received
Coax AIS detected "AIS"	Amber	--	Fast blink (10Hz): AIS Received.
Coax PRBS detected "PRBS"	Amber	--	Blink 10 Hz: PRBS Received. Blink 1 Hz: Forcing PRBS onto BNC-Out.

T3/E3 SPECIFICATION CHART:

Model Type	T3/E3
Protocols	ANSI: T1.102, T1.107, T1.404, T1-404a (T3), ITU: G.703, (E3), G.751, O.151 ETSI: EN 300 689, 300 686, 300 687
Copper Connectors	RG-59 Coax, 75 ohm, BNC DS3: 380m, E3: 440m
Fiber Connectors	SC, ST, LC, MT-RJ, SFP
Controls	T3/E3 Sel, Coax Build-Out, Coax En/Dis, Fiber En/Dis, AIS to Fiber, AIS to Coax, PRBS to Coax, Loop-Bk Coax, Loop-Bk Fiber, Loop-Bk Remote
LED Displays	Power, Fiber Act, Coax Act, Fiber AIS Det, Coax AIS Det, Coax PRBS Det, Fiber Test, Fiber Loop-Bk, Coax Loop-Bk
Dimensions	W:0.85" x D:4.5" x H:2.8"
Weight	8 oz.
Compliance	UL, CE, FCC Class A
Power Requirement	0.7A @ 3.3VDC (typical)
Temperature	Standard: 0 to 50º C Wide: -40 to 60º C Storage: -40 to 80º C
Humidity	5 to 95% (non-condensing)
Altitude	-100m to 4000m
MTBF (hrs)	510,000

MOUNTING INSTRUCTIONS and CABLE ATTACHMENTS:

iConverter modules are hot-swappable and can be installed into any chassis in the *iConverter* family.

1. Carefully slide the *iConverter* module into the installation slot, aligning the module with the installation guides. Ensure that module is firmly seated against the backplane.
2. Secure the module by securing the panel fastener screw (attached to module) to chassis front.
3. When using an SFP model (8759-0), insert the SFP Fiber transceiver into the SFP receptacle on the module.
   Note: The release latch of the SFP Fiber transceiver must be in the closed position before insertion.
4. Connect the fiber cables between the T3/E3 converters. The Transmit (TX) must attach to the Receive (RX) and the Receive must attach to the Transmit.
5. When using a single-fiber models, you must use mating converters. For example, if one converter is the model 8750-1 (TX=1310nm, RX= 1550nm), the other converter must be model 8751-1 (TX=1550nm, RX=1310nm).
6. Attach the BNC cables to the T3/E3 converter and attach the other end of the cables to appropriate network equipment. The Transmit must attach to the Receive and the Receive must attach to the Transmit.

Warning

The operating description in this Instruction Manual is for use by qualified personnel only. To avoid electrical shock, do not perform any servicing of this unit other than that contained in the operating instructions, unless you are qualified and certified to do so by Omnitron Systems Technology, Inc.

Warranty

This product is warranted to the original purchaser against defects in material and workmanship for a period of TWO YEARS from the date of shipment. A LIFETIME warranty may be obtained by the original purchaser by REGISTERING this product with Omnitron within 90 days from the date of shipment. TO REGISTER, COMPLETE AND MAIL OR FAX THE ENCLOSED REGISTRATION FORM. Or you may register your product on the Internet at www.omnitron-systems.com. During the warranty period, Omnitron will, at its option, repair or replace a product which is proven to be defective.

For warranty service, the product must be sent to an Omnitron designated facility, at Buyer's expense. Omnitron will pay the shipping charge to return the product to Buyer's designated US address using Omnitron's standard shipping method.

Limitation of Warranty
The foregoing warranty shall not apply to defects resulting from improper or inadequate use and/or maintenance of the equipment by Buyer, Buyer-supplied equipment, Buyer-supplied interfacing, unauthorized modifications or tampering with equipment (including removal of equipment cover by personnel not specifically authorized and certified by Omnitron), or misuse, or operating outside the environmental specification of the product (including but not limited to voltage, ambient temperature, radiation, unusual dust, etc.), or improper site preparation or maintenance. No other warranty is expressed or implied. Omnitron specifically disclaims the implied warranties of merchantability and fitness for any particular purpose.

Exclusive Remedies
The remedies provided herein are the Buyer's sole and exclusive remedies. Omnitron shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any legal theory.

TECHNICAL SUPPORT:
For help with this product, contact our Technical Support:
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